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(54) CAST GLOSSY PAPER FOR INK JET RECORDING AND MANUFACTURING METHOD THEREFOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a cast glossy paper for ink jet recording, with which a high quality recording image and an excellent preservability can be obtained especially with an ink jet dye ink on a cast coat paper having a high evenness and lustrous properties, and its manufacturing method.

SOLUTION: This cast glossy paper for ink jet recording is a cast coat paper, in which an ink accepting layer is provided on at least one side of a base paper and a coating layer forming a glossy layer including a pigment for giving gloss and a binder is formed on the ink accepting layer. The coating layer is a coating surface solidifyingly treated with a coagulating agent. The cast glossy paper is produced by compression-bonding the coating surface under its wet state with a heated and mirror-finished metal surface. AS the coagulating agent, a metal salt and two kinds or more of organic cationic agents, chemical compositions of which are different from each other or molecular weights of which are different from each other, are employed jointly and at least one kind or more of the cationic agent are dimethylamine epichlorohydrin-based cationic agents.

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CLAIMS

[Claim(s)]

[Claim 1] An ink absorbing layer is established in one [at least] field of stencil paper. On this ink absorbing layer The coating layer used as the gloss layer containing the pigment and binder for carrying out gloss grant is formed. This coating layer is the spreading side which carried out coagulation processing using the coagulant, and it is cast glossy paper which it comes to stick to the metal side of mirror plane finishing which had this coating layer heated while said coating layer was in the damp or wet condition by pressure. Cast glossy paper for ink jet record which a metal salt differs from two or more kinds of chemical presentations as the above-mentioned coagulant, or uses together the organic cation agent from which molecular weight differs, and is characterized by one or more of kinds of this being a dimethylamine epichlorohydrin system at least.

[Claim 2] The metal salt in said coagulant liquid is cast glossy paper for ink jet record according to claim 1 which is water solubility and is characterized by the weight concentration-being 0.5 - 5.0 % of the weight including a divalent metal salt.

[Claim 3] The organic cation agent in said coagulant liquid is cast glossy paper for ink jet record according to claim 1 or 2 which comes to mix two or more kinds of chemical presentations, or the water soluble polymer electrolyte with which physical structures differ, and is characterized by the AUW concentration being 1.0 - 5.0 % of the weight.

[Claim 4] It is glossy paper for ink jet cast record according to claim 1, 2, or 3 with which the maximum surface for carrying out gloss grant contains colloidal silica in the coating layer formed on the above-mentioned ink absorbing layer, the particle diameter of this colloidal silica is 20nm or less, and the binder in said coating layer is water solubility, and weight of the binder is characterized by being the five to 30 section to the colloidal silica 100 weight section.

[Claim 5] The metal salt in said coagulant liquid is cast glossy paper for ink jet record according to claim 1, 2, 3, or 4 characterized by being a divalent alkaline earth metal which the formic acid configurated, or transition metals.

[Claim 6] After forming an ink absorbing layer in one [at least] field of stencil paper, on the ink absorbing layer After forming the coating layer which applied the coating liquid which furthermore contains a pigment and an aquosity binder The coagulation liquid which dissolved the coagulant which comes to use together a metal salt and two or more kinds of different-species organic cation agents is used. The manufacture approach of the cast glossy paper for ink jet record which carries out coagulation processing of the coating side, and is characterized by being stuck to the metal side of mirror plane finishing which had this coating layer heated while the coating layer was in the damp or wet condition by pressure, and obtaining a gloss layer.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] Especially this invention relates to the cast glossy paper for ink jet record which has the outstanding ink jet record fitness and the shelf life of a record image about the cast glossy paper for ink jet record.

[0002]

[Description of the Prior Art] an ink jet recording method -- the noise -- few -- processes, such as development and fixing, -- unnecessary -- in addition -- and since full color printing can be carried out easily, it is used for various printers etc. and is spreading quickly in recent years. So, the need of an ink jet record medium is increasing rapidly.

[0003] Recently, with high-performance-izing of the printer of the ink jet method which used water color ink, property-demands, such as superabsorbency, the repeatability of a faithful dot, and a water resisting property, come to be carried out also to the sheet for [recorded], and the coat paper which prepared the ink absorbing layer on the base material has been developed.

[0004] Moreover, improvement in the further engine performance has been required of the ink jet record sheet which is a record medium with fullness-izing and spread-izing of a peripheral device, such as a digital camera and a scanner, besides high-performance-izing of an ink jet method printer. That is, the surface gloss other than ink jet printing fitness good now which applications, such as improvement in the speed of ink jet record, highly-minute-izing of a record image, and full-color-izing, make extensive is high, and the ink jet record form which has the outstanding appearance has been required. As a demand in which it is added to it and deals, also appearances and properties properties, such as gloss, a hue, and a feeling of a feel, and to be also similar to printing paper and the print sheet of a film photo have been demanded.

[0005] Generally as a high form of surface gloss, it is processing a coated paper front face for a plastics pigment in the air or the inorganic pigment of tabular or a very fine particle by calender processing after coating. The cast coated paper obtained by copying the mirror plane is known by sticking by pressure and drying the coated paper or the humid coating layer of the type which applied the coated paper which obtained high smooth nature, and the synthetic resin which has high absorptivity and the outstanding membrane formation nature to the heating drum side which has a mirror plane.

[0006] This cast coated paper is used as a high-grade print sheet also in printed matter in many cases according to the reason have surface gloss and smooth nature still higher than the usual coated paper by which data smoothing was carried out in coated paper front faces, such as a super calender, and the outstanding printability is acquired. However, when this cast coated paper is used as an ink jet record form, there are also some fault points.

[0007] The disadvantageous point of the some is mentioned. First, in the case of cast coated paper, although gloss is discovered by making a mirror plane drum side imprint, in order to acquire high gloss, existence of membrane formation nature matter, such as casein, polyvinyl alcohol, and urethane, must usually use it so much indispensably. However, these membrane formation nature matter can also serve as a factor to which the absorption to the coated paper of ink jet ink is checked, consequently a printing side

spreads or drying [of ink] gets worse remarkably. On the contrary, although ink absorptivity will improve if the amount of this membrane formation nature matter used is reduced, a gloss value will fall.

[0008] Moreover, the Nonion nature or the anionic thing of the pigment and binder which are used for the cast coating is in use, and in this structure, they cannot fully be established in the ink of an ink jet, consequently become what has the waterproof low defect and the printing concentration of the record image section.

[0009] Generally in the fall of the waterproof defect of such an ink jet record form, or printing concentration, fixable [of ink] can be improved by introducing an organic cation agent into a coating layer, and the above-mentioned problem can be solved to it. However, in cast coating liquid, the cationic matter is deficient in compatibility with the release agent which is anionic, the binder which carried out alkali denaturation, and thickening and condensation may be caused. Thus, the application to the cast coated paper of the cationic matter must choose suitable conditions, such as a class of the cationic matter, and an addition, the order of addition at the time of preparation.

[0010] moreover , although the approach of use metal salts , such as formic acid calcium , (for example , refer to JP,10-6639,A) be indicate as a coagulant of cast coating liquid , it become inadequate , if there be little this amount used gel [of the cast coating liquid to which gloss be make to give] , and it become coated paper with low glossiness and printing concentration , and if many [too] , deterioration of the ink coloring matter of the record image section will pose a problem . Moreover, the water resisting property of the record image section is not fully given only with such a metal salt.

[0011] Next, although a large number [the example of a report which uses organic cation agents, such as a cationic polymer,] as a coagulant of cast coating liquid, the point that a water resisting property is given by the use, and the point that the color tone of the record image section accompanying increase of the amount used changes are characteristic. Moreover, it is mentioned that the point which comes to be inferior in ink absorptivity with increase of the amount used as a trouble, and the part to which a water resisting property is given and the inclination for lightfastness to be inferior become remarkable.

[0012] By the above, when using an organic cation agent as coagulation liquid, also in view of the printing concentration of the record image section, a color tone, and the shelf life of the record image sections further, such as a water resisting property and lightfastness, the class and amount used other than the gelation degree of cast coating liquid must be determined. Generally, a fault is weaker than a metal salt, the gelation reinforcement of an organic cation agent is only the organic cation agent of an item kind, its balance [quality of printed character / of the record image section] is good, and it is the most difficult work to raise all improvement indispensable items.

[0013] The organic cation agent is various, is excellent in ink fixable in it, and has what has an especially good water resisting property, the thing which is excellent in the color enhancement of ink, or lightfastness although a water resisting property is inferior. A waterproof good organic cation agent is inferior to lightfastness generally, and a light-fast good thing has the inclination to be inferior to a water resisting property. for improving ink jet record fitness -- these -- ***** -- it is necessary to blend an organic cation agent with sufficient balance, and to raise a water resisting property and lightfastness to coincidence, and there is already a limitation in diversifying functionality only by the item kind organic cation agent. Moreover, the functionality changes sharply by a

chemical presentation or change of physical structure, in addition it has big effect on ink jet record fitness with molecular weight, pH, etc.

[0014]

[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer a quality record image and the cast glossy paper for ink jet record with which the outstanding shelf life is acquired about the cast glossy paper which has high smooth nature and high glossiness especially using ink jet color ink.

[0015]

[A means to solve invention] The cast glossy paper for ink jet record concerning this invention An ink absorbing layer is established in one [at least] field of stencil paper. On this ink absorbing layer The coating layer containing the pigment and binder for carrying out gloss grant is formed, and this coating layer is the spreading side which carried out coagulation processing using the coagulant. And it is cast coated paper which it comes to stick to the metal side of mirror plane finishing which had this coating layer heated while said coating layer was in the damp or wet condition by pressure. A metal salt differs from two or more kinds of chemical presentations as the above-mentioned coagulant, or the organic cation agent from which molecular weight differs is used together, and it is characterized by one or more of kinds of this being a dimethylamine epichlorohydrin system at least.

[0016] In the cast glossy paper for ink jet record according to claim 1, the metal salt in coagulant liquid is water solubility, and it is characterized by the weight concentration being 0.5 - 5.0 % of the weight including a divalent metal salt.

[0017] In the cast glossy paper for ink jet record according to claim 1 or 2, the organic cation agent in coagulant liquid comes to mix two or more kinds of chemical presentations, or the water soluble polymer electrolyte with which physical structures differ, and is characterized by the AUW concentration being 1.0 - 5.0 % of the weight.

[0018] In the coating layer formed on the ink absorbing layer in the cast glossy paper for ink jet record according to claim 1, 2, or 3, the maximum surface for carrying out gloss grant contains colloidal silica, and the particle diameter of this colloidal silica is 20nm or less, and it is characterized by for the binder in said coating layer being water solubility, and the weight of the binder being the five to 30 section to the colloidal silica 100 weight section.

[0019] In the cast glossy paper for ink jet record according to claim 1, 2, 3, or 4, the metal salt in coagulant liquid is characterized by being a divalent alkaline earth metal which the formic acid configurated, or transition metals.

[0020] The manufacture approach of the cast glossy paper for ink jet record concerning this invention After forming an ink absorbing layer in one [at least] field of stencil paper, on the ink absorbing layer After forming the coating layer which applied the coating liquid which furthermore contains a pigment and an aquosity binder Using the coagulation liquid which dissolved the coagulant which comes to use together a metal salt and two or more kinds of different-species organic cation agents, coagulation processing of the coating side is carried out, and while a coating layer is in a damp or wet condition, it is characterized by being stuck to the metal side of mirror plane finishing which had this coating layer heated by pressure, and obtaining a gloss layer.

[0021] Although the water solution of the metal salt of an item kind or an organic cation agent, or the metal salt of an item kind and the combination of an organic cation agent

has been conventionally used for the coagulation liquid of cast coating liquid in manufacture of the cast glossy paper for ink jet record by this solidifying method, there is no example which applied two or more sorts of combination of an organic cation agent for the purpose of improvement in the further quality of printed character.

[0022] When using a metal salt as a coagulant, in this invention A formic acid, an acetic acid, Although the water solution of each salt, such as calcium of a citric acid, a tartaric acid, a lactic acid, a hydrochloric acid, a nitric acid, and a sulfuric acid, zinc, magnesium, and aluminum, and the metal salt further chosen from borax, boric acid, etc. which contains a kind at least is applicable Use of formic-acid calcium or formic-acid zinc is desirable still more suitably [a divalent alkaline earth metal which the formic acid configurated by comprehensive evaluation of the solubility to water, a salting out effect, coagulation ability, etc., etc., or transition metals] desirable.

[0023] Although a formula, solid content, the amount of coating, etc. of coating liquid need to adjust the concentration of the metal salt as a coagulant, in this invention, the following conditions are mentioned as range which does not have trouble in the quality of coated paper, shelf life, and cast coating fitness. That is, 0.5 - 5.0 % of the weight is 1.0 - 3.0 % of the weight desirable still more suitably in coagulation liquid.

[0024] When using an organic cation agent together with a metal salt, in this invention, as a coagulant to an organic cation agent Polyvinylbenzyl trimethyl ammonium halide, polydiallyl ammonium halide, A poly dimethylaminoethyl methacrylate hydrochloride, polyethyleneimine, A cyanogen amide formalin condensate, EPIKURORUDOH1 drine compounds denaturation poly alkylamine, Cationic resin, such as polyalkylene polyamine, such as polyvinyl pyridinium halide, and polyethylene polyamine, polypropylene polyamine, or a derivative of those, acrylic resin that has the 3rd class amino group and the 4th class ammonium, and a JIAKURIRU amine, can be added. Here, description is the gestalt of the ammonium salt which is easy to ionize in a drainage system on cast coating operability so that an organic cation agent may wish.

[0025] In this invention, although the concentration of the organic cation agent as a coagulant depends also on the concentration of formic-acid calcium, the class of cation agent which combines, and blend ratio which are used together, the following conditions are mentioned as range where two or more kinds of chemical presentations or the AUW concentration of the organic cation agent from which physical structure differs does not have trouble in the quality of coated paper, shelf life, and cast coating fitness. That is, 1.0 - 5.0 % of the weight is desirable in coagulation liquid.

[0026] If an organic cation agent is used as a coagulant in the above range, the coating layer surface reinforcement which is the fundamental physical properties of coated paper, and glossiness will serve as an outstanding property. Moreover, it becomes what also has the shelf life of printing concentration, a color tone, and the record image section good [the quality of printed character of the record image section]. However, a fall and water resisting property of printing concentration come to be inferior in the amount of an organic cation agent being under the minimum of this range.

[0027] On the contrary, when the amount of an organic cation agent exceeds the upper limit of this range, a color tone, poor ink absorptivity, and lightfastness come to be inferior. moreover, the cast drum at the time of cast coating operation -- it sticks and a phenomenon happens.

[0028] Moreover, cast coating liquid contains colloidal silica and, as for the particle

diameter of the colloidal silica, it is desirable that it is 20nm or less. In addition, when this particle diameter deviates from the above-mentioned range, it becomes cast coated paper of a mat tone without a feeling of gloss in many cases. If the smooth nature on the front face of coated paper falls, while an exterior and a high-class feeling will fade away, a result which spoils greatly the reason which cannot secure the repeatability of a faithful dot, and a quality of printed character is also brought.

[0029] And as a binder of the colloidal silica in this cast coating liquid, at least one or more sorts can be chosen from things, such as casein, gelatin, urethane, polyvinyl alcohol, and methyl cellulose. If gelation, the ease of obtaining of operability and a gloss layer, etc. are synthesized and taken into consideration, it can be said to be an ingredient with more desirable casein. Moreover, about the amount of this binder, the five to 30 section is desirable to the colloidal silica 100 weight section.

[0030] A glossy surface will not be formed if there are few amounts of this binder than the above-mentioned range. Moreover, if many [conversely / too], although a glossy surface is made, a quality of printed character will deteriorate. That is, printing concentration falls or the sharpness of the streak section boundary of the record image section is spoiled. Furthermore, it is obliged to supply of superfluous heat energy, and also comes to cause the fall of productivity from the point of a desiccation load.

[0031] The coating of the cast liquid in manufacture of the cast glossy paper for ink jet record of this invention is manufactured in the cast coating machine which has adopted the so-called humidity method or the solidifying method.

[0032] After making the maximum front face of the coating layer which applied and obtained coating liquid form on the ink absorbing layer on a base material, by the time it sticks the paint film on the obtained front face of the maximum to the machined surface of the heated mirror plane by pressure, in this invention, the water solution containing two or more kinds of organic cation agents and metal salts will be sprinkled and applied to this paint film. Then, the cast is carried out and the cast glossy paper for ink jet record is obtained.

[0033] The cast glossy paper for ink jet record of this invention has an ink absorbing layer under the coating layer which is a gloss layer. As a pigment contained in the ink absorbing layer of this invention, although synthetic silicas, such as a kaolin, talc, a calcium carbonate, a calcium lactate, hydroxyapatite, a zeolite, a mica, a titanium dioxide, clay, a zinc oxide, magnesium oxide, an aluminum hydroxide, an aluminum oxide, barium titanate, a barium sulfate, lead titanate and an amorphous silica, and amorphous silica, etc. are mentioned, in this invention, at least one or more kinds can be suitably chosen and used out of these pigments. The pigment used in the cast coated paper of this invention has also among the above use of the pulverized coal of the synthetic silica which is porosity more desirable than the ink absorptivity. in addition -- the synthesis method of this silica -- a sedimentation type, a gel type, a CVD method, PVD, and MBE -- it is not limited although a large number [law, a hydrothermal crystallization method, a sol-gel method, etc.].

[0034] and as a binder contained in the ink absorbing layer of this invention

Polyethylene, polypropylene, a polyisobutylene, polystyrene, A polyvinyl chloride, a polyvinylidene chloride, polyethylene vinyl acetate, polyvinyl acetate, Polyvinyl alcohol, a polyvinyl acetal, polyacrylic acid ethyl, A polymethyl methacrylate, a polyacrylonitrile, polytetrafluoroethylene, Polychlorotrifluoroethylene resin, polyvinylidene fluoride,

polybutadiene, Polyisoprene, polychloroprene, nylon 6, nylon 6 and 6, polyethylene terephthalate, Polybutylene terephthalate, a polycarbonate, polyacetal, Pori (bis-chloro MECHIRUOKISA cyclobutane), polyethylene oxide, Polypropylene oxide, polyphenylene oxide, polysulfone, The Polly p-xylylene, polyimide, polybenzimidazole, a polysiloxane, phenol resin, a urea-resin, melamine resin, alkyd resin, an unsaturated polyester resin, diallyl phthalate resin, an epoxy resin, polyurethane, a terpene, etc. are mentioned. In this invention, although it can be used choosing suitably from these binders and two or more sorts may be used together, in view of the ink absorptivity, binding capacity, etc., use of polyethylene vinyl acetate resin or polyvinyl alcohol is especially desirable.

[0035] Cast coating liquid is usually prepared as aqueous coating liquid by the coating liquid list of the ink absorbing layer in this invention. About the pigment in this coating liquid, and the mixing ratio of a binder, although it depends also on the thought of coated paper designs, such as physical properties to which the coated paper made into a pigment kind, a binder kind, coating conditions, or the purpose should be added, if it is in the criteria as which the physical properties of the coated paper obtained are required, it will not be limited especially.

[0036] In the coating liquid of the ink absorbing layer in this invention, the following assistants may be added if needed. That is, a dispersant, a water retention agent, a thickener, a defoaming agent, antiseptics, a color, a deck-watertight-luminaire-sized agent, fluorescent dye, a preservative, an ultraviolet ray absorbent, a release agent, lubricant, and an organic cation agent can be added if needed.

[0037] The following [method / of an ink absorbing layer / coating] are mentioned. Coating methods, such as a blade coating machine, an air knife coater, a roll coater, a comma coating machine, a curtain coating machine, a bar coating machine, and a spin coater, can be chosen suitably, and can be used.

[0038] In order to form an ink absorbing layer, in the desiccation process after coating, the following [method / the / desiccation] are mentioned in the coating liquid which carries out coating on a base material. Although an infrared drying, hot air drying, ordinary temperature desiccation, a freezing vacuum drying, etc. occur, the above-mentioned desiccation method can be chosen suitably and can be used.

[0039] About the amount of coating of the ink absorbing layer in this invention, when there are few amounts of coating of a coating layer, the ink blot depended badly [ink absorption] comes to take place, and in many, the printing concentration of the record image section comes to fall, and a productivity slowdown arises from the reasons of the desiccation load increase in a desiccation process etc. Furthermore, it comes to receive economical disadvantageous profit. Therefore, although the amount of coating of an ink absorbing layer has desirable 3 - 15 g/m², the further suitable conditions are 5 - 10 g/m².

[0040] About the amount of coating of the coating layer used as the gloss layer in this invention, when there are few amounts of coating of a coating layer, a good glossy surface is not acquired, and the poor coagulation of the coating layer which turns into a gloss layer in many is produced, and a productivity slowdown arises from the reasons of the desiccation load increase in a desiccation process etc. Furthermore, it comes to receive economical disadvantageous profit. Therefore, although the amount of coating of an ink absorbing layer has desirable 5 - 20 g/m², the further suitable conditions are 5 - 10 g/m². However, since the effect of the presentation of cast coating liquid, solid content,

water retention, viscosity, temperature, SP value, etc. is received in the absorbed amount of conditions, such as air permeability, an absorbed amount, smoothness, the U.S. tsubo, and a consistency, or an ink absorbing layer, void volume, air permeability, surface roughness, coating bed density and thickness, and a pan whenever [size / of stencil paper] about this condition, the above-mentioned range is not absolute.

[0041] In addition, acid paper, alkaline paper, etc. which are used for coated paper with the common stencil paper which serves as the base on the occasion of coating are used suitably. And if the printing fitness of an ink jet is considered and the ink absorptivity is taken into consideration, the paper base which consists of wood pulp will be desirable. As a pulp kind, non-wood pulp, such as LBP, NBKP, GP, TMP and corrosion gage point, wood pulp, such as DIP, and a kenaf, and a cotton, etc. is mentioned, and what used various additives, such as a binder and a sizing compound, and a yield improver, a paper reinforcing agent, for this pulp sheet more than a kind, and was mixed can be used. Furthermore, about pulp, use of ECF from the point of an environmental problem or TCF pulp is desirable.

[0042]

[Example] Although the example of this invention is given and explained below, this invention is not limited to these examples. Moreover, especially the section and % that are shown in an example show the weight section of solid content, and weight %, unless reference is made.

[0043] The stencil paper used as the <contents of base material> base material is the following specifications. For the U.S. tsubo 127 g/m², thickness-of-paper [of 130 micrometers], and Beck smoothness 50 seconds, it is air permeability 16.3 seconds, and consists of wood pulp.

[0044] Coating of the coating constituent which uses a porosity inorganic pigment and a binder as a main truss product was carried out on the <coating of ink absorbing layer> base material, and the ink absorbing layer was obtained. The coating constituent mixed and obtained the polyvinyl alcohol (PVA-117: Kuraray Co., Ltd. make) 10 section of marketing of commercial synthetic amorphous silica (Ms. KASHIRU P-78D: the Mizusawa chemistry company make) as the 100 sections and a binder, and the ethylene vinyl acetate (EVA AD-6K: Showa High Polymer Co., Ltd. make) 40 section as a porosity inorganic pigment. The solid content concentration of this coating constituent is 15%. This coating constituent was dried with the air dryer coating and after that on the base material so that it might become oven-dry-weight 5 g/m² in an air knife coater, and the ink absorbing layer was obtained.

[0045] As an example 1 <preparation of gloss layer coating liquid> pigment, the casein 10 section was prepared as the colloidal silica (gold [a silica / 20]: Nippon Chemical Industrial Co., Ltd. make, particle diameter of 10-15nm) 100 section, and a binder, the calcium stearate (Sannopuko make, NOPUKOTO C104) 2 section and the Turkey-red-oil 2 section were prepared as a release agent, and gloss layer coating liquid of 20% of concentration was obtained.

[0046] The coagulation liquid which will contain a cation agent by the time it sticks <coating of gloss layer> gloss layer coating liquid to the heated machined surface which carried out coating on the base material by pressure so that it may become oven-dry-weight 10 g/m² in a roll coater is applied to this coating film. Then, the cast glossy paper for ink jet record was obtained.

[0047] as coagulation liquid -- the mixing ratio of 1% (trade name: PAPIOGEN P-103, the product made from SENKA, molecular weight 30,000) of formic-acid calcium 3% and dimethylamine epichlorohydrin system resin, and 2% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ, 10,000 or less molecular weight) -- the water solution which consists of rates was used, cast liquid was solidified, and coated paper was obtained.

[0048] Except having made the formic-acid calcium of example 2 coagulation liquid into 0.5%, coated paper was obtained the condition as indicated in the example 1.

[0049] Except having carried out to formic-acid calcium 5% of example 3 coagulation liquid, coated paper was obtained the condition as indicated in the example 1.

[0050] Except having carried out to formic-acid calcium 3% of example 4 coagulation liquid, coated paper was obtained the condition as indicated in the example 1.

[0051] as example 5 coagulation liquid -- the mixing ratio of 3% (trade name: PAPIOGEN P-103, product made from SENKA) of formic-acid calcium 3% and dimethylamine epichlorohydrin system resin, and 2% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, cast liquid was solidified, and coated paper was obtained by the cast.

[0052] Except that the casein in example 6 cast liquid is 5 weight sections, it is equivalent to an example 1.

[0053] Except that the casein in example 7 cast liquid is 30 weight sections, it is equivalent to an example 1.

[0054] as example 8 coagulation liquid -- the mixing ratio of 1% (trade name: SUMIRE gap gin 1001, Sumitomo Chemical Co., Ltd. make) of formic-acid calcium 3% and JIAKURIRU amine acrylamide system resin, and 2% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0055] As example 9 coagulation liquid, formic-acid calcium 3%, the water solution which consists of mixed ratios of 1% (trade name: Huy Max SC-600L, product made from HAIMO) of poly dimethyl diaryl ammoniumchloride system resin and 2% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0056] as example 10 coagulation liquid -- the mixing ratio of 1% (trade name: JK-14, the Akinari chemistry company make) of formic-acid calcium 3% and polyamine system resin, and 2% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0057] as example 11 coagulation liquid -- the mixing ratio of 2% (trade name: made in [Ohara palladium company] Para Cong PJ) of formic-acid calcium 3% and polyoxyethylene alkylamine (trade name: AMITO 105, Kao Corp. make) 1% and dimethylamine epichlorohydrin system resin -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0058] as example 12 coagulation liquid -- the mixing ratio of 3% of formic-acid zinc, 1% (trade name: PAPIOGEN P-103, product made from SENKA) of dimethylamine

epichlorohydrin system resin, and 2% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0059] As example of comparison 1 coagulation liquid, the formic-acid calcium 0.3% water solution was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0060] As example of comparison 2 coagulation liquid, the formic-acid calcium 6% water solution was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0061] as example of comparison 3 coagulation liquid -- the mixing ratio of 3% of calcium lactates, and 3% of dimethylamine epichlorohydrin system resin (trade name: PAPIOGEN P-103, product made from SENKA) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0062] as example of comparison 4 coagulation liquid -- the mixing ratio of 3% of formic-acid calcium 3% and dimethylamine epichlorohydrin system resin (trade name: PAPIOGEN P-103, product made from SENKA) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0063] as example of comparison 5 coagulation liquid -- the mixing ratio of 3% of formic-acid calcium 3% and JIAKURIRU amine acrylamide system resin (trade name: SUMIRE gap gin 1001, Sumitomo Chemical Co., Ltd. make) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0064] as example of comparison 6 coagulation liquid -- the mixing ratio of 3% of formic-acid calcium 3% and poly dimethyl diaryl ammoniumchloride system resin (trade name: Huy Max SC-600L, product made from HAIMO) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0065] as example of comparison 7 coagulation liquid -- the mixing ratio of 3% of formic-acid calcium 3% and polyamine system resin (trade name: JK-14, the Akinari chemistry company make) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0066] as example of comparison 8 coagulation liquid -- a formic-acid calcium 3% and polyoxyethylene alkylamine (trade name: AMITO 105, Kao Corp. make) 3% mixing ratio -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0067] as example of comparison 9 coagulation liquid -- the mixing ratio of 3% of formic-acid calcium 3% and dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0068] The water solution of 6% of example of comparison 10 dimethylamine epichlorohydrin system resin (trade name: PAPIOGEN P-103, product made from SENKA) was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0069] As example of comparison 11 coagulation liquid, the water solution of 6% of

JIATURIRU amine acrylamide system resin (trade name: SUMIRE gap gin 1001, Sumitomo Chemical Co., Ltd. make) was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0070] As example of comparison 12 coagulation liquid, the water solution of 6% of poly dimethyl diaryl ammoniumchloride system resin (trade name: Huy Max SC-600L, product made from HAIMO) was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0071] As example of comparison 13 coagulation liquid, the water solution of 6% of polyamine system resin (trade name: JK-14, the Akinari chemistry company make) was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0072] As example of comparison 14 coagulation liquid, the polyoxyethylene alkylamine (trade name: AMITO 105, Kao Corp. make) 6% water solution was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0073] As example of comparison 15 coagulation liquid, the water solution of 6% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0074] as example of comparison 16 coagulation liquid -- the mixing ratio of 0.2% (trade name: PAPIOGEN P-103, product made from SENKA) of formic-acid calcium 3% and dimethylamine epichlorohydrin system resin, and 0.3% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0075] as example of comparison 17 coagulation liquid -- the mixing ratio of 1% (trade name: PAPIOGEN P-103, product made from SENKA) of formic-acid calcium 3% and dimethylamine epichlorohydrin system resin, and 5% of dimethylamine epichlorohydrin system resin (trade name: made in [Ohara palladium company] Para Cong PJ) -- the water solution which consists of rates was used, gloss layer coating liquid was solidified, and coated paper was obtained.

[0076] Except that the casein in example of comparison 18 cast liquid is the 2.5 weight sections, it is equivalent to an example 1.

[0077] Except that the casein in example of comparison 19 cast liquid is 35 weight sections, it is equivalent to an example 1.

[0078] It is equivalent to an example 1 except having changed the colloidal silica in example of comparison 20 cast liquid with Snow tex ST-UP (the Nissan Chemical Industries, Ltd. make, particle diameter of 40-100nm).

[0079] Thus, the feeling of blank paper gloss of the obtained cast coated paper, ink jet record fitness, and an operable result were summarized in Table 1 and 2. In addition, the following point and an approach estimated about the above-mentioned evaluation.

(Feeling of blank paper gloss)

Viewing estimated.

O a feeling of feeling fitness of :gloss **:gloss -- with [it is the level x:mat tone which is not a problem practically, and] no feeling of gloss although it is a little low.

[0080] (Image printing concentration) It printed in the color ink of 2500CPs of Hewlett Packard, and viewing estimated ink concentration and color enhancement.

O :printing concentration and color enhancement -- very much -- fitness O:printing

concentration fitness **:printing concentration and ** -- the level x:printing concentration which is not a problem practically although it is low -- the level [0081] which is low and does not bear practical use (Image water resisting property) The recording paper after printing was immersed underwater and viewing estimated the outflow of the ink of 30 minutes after, and change of printing concentration.

O A :image water resisting property fitness **:image water resisting property and *****x : a poor image water resisting property [0082] (Image lightfastness) WEZA meter estimated the xenon lamp and viewing estimated Mitsuteru putting and change of printing concentration for the recording paper after printing for 24 hours.

O :image lightfastness fitness **:image lightfastness and *****x : poor image lightfastness [0083] (Mold-release characteristic) The coated paper which separates from a metaled sticking-by-pressure side stuck, and viewing estimated condition.

O :mold-release characteristic fitness ** : a mold-release characteristic and a poor ***** x:mold-release characteristic [0084]

[Table 1]

[0085]
[Table 2]

[0086]

[Effect of the Invention] the cast glossy paper for ink jet record applied to this invention a passage clear from the result of Table 1 and 2, and its manufacture approach -- a surface feeling of gloss -- high -- ink jet fitness -- excelling -- in addition -- and it is good also to cast operability.

[0087] Especially this invention is excellent in the printing concentration in the record image section, a water resisting property, or lightfastness also in the property of the ink jet recording paper. Consequently, the shelf life of the quality of printed character of the record image section, printing concentration, a color tone, and the record image section is also good. moreover, the cast drum at the time of cast coating operation -- it sticks, there is also no phenomenon and a mold-release characteristic is good.